

First Release



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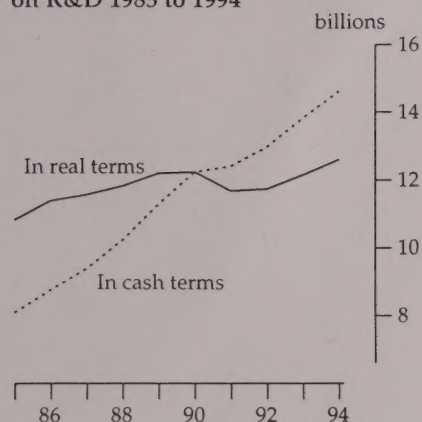
Gross Domestic Expenditure on Research and Development 1994

Gross expenditure on R&D in the UK

	In cash terms	In real terms(a)	Cash terms per cent GDP
	(£million)		
1985	8093	10826	2.27
1986	8768	11386	2.29
1987	9383	11569	2.22
1988	10227	11818	2.18
1989	11288	12193	2.20
1990	12238	12238	2.23
1991	12406	11677	2.16
1992	12981	11740	2.18
1993	13829	12153	2.20
1994	14613	12605	2.19

a) 1990 prices, calculated using GDP deflator.

Gross domestic expenditure
on R&D 1985 to 1994



In 1994 the UK's Gross Domestic Expenditure on R&D was £14.6 billion. This represented an increase, in cash terms, of 6 per cent from the level in 1993. The increase between 1993 and 1994 was 4 per cent in real (constant price) terms.

In real terms, Gross Domestic Expenditure on R&D rose between 1985 and 1990 by 13 per cent. Having fallen in 1991, expenditure has risen to £12.6 billion in 1994 (at 1990 prices).

In 1994, expenditure on R&D was 2.19 per cent of gross domestic product.

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Gross Domestic Expenditure on Research and Development 1994

In 1994 the UK's Gross Domestic Expenditure on R&D was £14.6 billion. This represented an increase, in cash terms, of 5.7 per cent from the level in 1993. The increase between 1993 and 1994 was 3.7 per cent in real (constant price) terms.

In real terms, Gross Domestic Expenditure on R&D rose between 1985 and 1990 by 13 per cent. Having fallen in 1991, expenditure has since risen to £12.6 billion in 1994 (at 1990 prices), above the earlier peak level of 1990.

In 1994, expenditure on R&D was 2.19 per cent of gross domestic product.

Gross Domestic Expenditure on Research and Development (R&D) in the UK (tables 1,2 and 3)

The estimate of the UK's Gross Domestic Expenditure on R&D in 1994 was £14.6 billion compared with £13.8 billion in 1993. R&D expenditure for civil purposes at £12.4 billion in 1994 was 5.6 per cent higher in cash terms than for 1993. R&D expenditure for defence purposes, at £2.2 billion, increased by 6.0 per cent in cash terms from the 1993 level. As a percentage of GDP defence expenditure on R&D has declined from 0.5 per cent in 1989 to 0.3 per cent in 1994.

Performers of R&D in the UK (table 2)

The sectors of the economy carrying out this R&D in 1994 were (in cash terms):

Business enterprises: £9.5 billion compared with £9.1 billion in 1993.

Government: £2.0 billion compared with £1.9 billion in 1993.

Higher education: £2.6 billion compared with £2.3 billion in 1993.

Private non-profit: £0.5 billion, similar to 1993.

Funding of R&D in the UK (tables 4 and 5)

In 1994 Government funded 32 per cent of all R&D performed in the UK, (27 per cent of civil R&D and 60 per cent of defence R&D).

NOTES on R&D

1. This First Release presents estimates of Gross Domestic Expenditure on Research and Development in the UK (GERD) in 1994.
2. More detailed figures will be published in May 1996 by the DTI's Office of Science and Technology (OST) in the Forward Look of Science and Technology², and later in the year in CSO's Economic Trends³. Detailed tabulations for Business Enterprise R&D were published in February 1996 in Business Monitor MO14 edition 7. International comparisons are published by the Organisation of Economic Cooperation and Development (OECD)⁴.

Sources

3. Two annual surveys of R&D are conducted by CSO. One is addressed to all government departments and covers R&D performed in or funded by the Central Government sector. (See the classification of sectors below). Detailed results, including figures for individual departments, will be available from the CSO on request after they have appeared in the OST's Forward Look of Science and Technology. This publication has detailed analyses of the net expenditure of government departments (ie. which includes government expenditure on R&D performed outside central government, less any receipts for work performed within central government).
4. The other annual survey is addressed to businesses performing R&D. The 1994 survey results were first published in a CSO First Release on 17 November 1995.
5. The government funding totals in tables 4 and 5 differ from tables showing departmental breakdowns of net expenditure in OST's Forward Look of Science and Technology. Tables 4 and 5 use information on government funded R&D from the survey of Business Enterprise R&D. The Forward Look of Science and Technology tables use the survey of government funded R&D. The differences are due chiefly to the way each survey records the R&D content of Ministry of Defence contracts.

Definition of R&D

6. The definitions used here are based on those internationally agreed by OECD; they are set out in the Frascati Manual¹.
7. The guiding line to distinguish R&D activity is the presence of an appreciable element of innovation. If the activity follows an established pattern it is excluded; if it departs from routine and breaks new ground it is included. For example: activities such as routine testing, market research, patent applications, trial production runs, and artistic design work, are excluded. Overheads are included. VAT is excluded.

Defence R&D

8. Defence includes all R&D programmes undertaken primarily for defence reasons regardless of their content or whether they have secondary civil applications. It includes nuclear and space R&D undertaken for defence purposes. It does not include civil R&D financed by the Ministry of Defence, for instance on meteorology or telecommunications. It includes defence R&D commissioned by overseas clients.

Classifications of sectors

9. The OECD terminology is used. "Government" corresponds to the "General Government" sector of the UK National Accounts and includes Local as well as Central Government. "Business enterprise" corresponds to the "Corporate" sector and includes public corporations and research associations as well as commercial and industrial companies. "Private non-profit" corresponds to the "Personal" sector of the National Accounts, except that higher education institutions are excluded and put into a separate OECD sector ("Higher Education"). "Abroad" corresponds to the "Overseas" sector.
 10. There is a significant discontinuity between 1985 and 1986. In 1986 the UK Atomic Energy Authority ceased to be a part of the Department of Energy and became a public corporation. Its expenditure therefore moved from the government sector to the business enterprise sector. Estimates of NHS R&D are in the government sector total and are included from 1991.
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Gross domestic expenditure on R&D (GERD)

11. GERD is the measure most commonly used for international comparisons. It covers all R&D performed in the country concerned irrespective of who pays for it. So, UK GERD covers all R&D in the UK including that funded from abroad; but it excludes R&D performed abroad even if funded from the UK. The four components of GERD relate to R&D performed in the four sectors of the economy.
 - a. **Government R&D** is based on the returns of intramural R&D in the government survey with the addition of CSO estimates for three other components : R&D performed by local authorities; some R&D within Central Government R&D not available from the survey; and the extra patient care costs arising from R&D in the NHS. (The latter is from the Department of Health's estimate that R&D accounts for one and a half per cent of the NHS budget). These three additional components amounted to £394m in 1994.
 - b. **Business enterprise R&D** is derived from the results of the CSO's business R&D survey.
 - c. **Higher Education R&D** is now estimated by the Higher Education Funding Councils for England, Scotland, Wales and the Department for Education in Northern Ireland. For more details see under revisions (Note 17).
 - d. **Private non-profit R&D** is derived partly from figures on government extramural R&D and R&D funding reported by Government, Higher Education and Business sectors and also CSO estimates.
 12. In addition to being analysed by sector of performance, GERD may be analysed by sector of funding. The R&D performed by any one sector of the economy can be funded by any of the other sectors or by the performing sector itself.
 13. For the purposes of estimating GERD the standard internationally recommended practice of the OECD is to use information from those performing R&D when this is available. These estimates are considered more reliable than those from surveys of R&D funders. This is why, in the UK GERD table, the estimate of business
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enterprise R&D funded by Government is from the business enterprise survey rather than the Government R&D survey.

14. The figures for R&D performed by Government and business enterprises may be considered more robust than the other GERD components, since they are based on survey results.

Gross Domestic Product (GDP)

15. The measure of GDP used is at market prices - based on the UN definition.

Real terms

16. Figures given in "real terms" are calculated using the GDP deflator adjusted for the abolition of domestic rates; 1990=100.

Revisions

17. Following agreement between the Funding Councils, CSO and OST a new methodology for estimating Government funded R&D expenditure in Higher Education has been introduced for 1994-95 and revisions have been made to the 1993-94 figures to enable year-on-year comparisons to be made. The new method uses grant income as a proxy for expenditure. The grants have been classified into three groups - 'research-oriented grants', 'teaching-oriented grants', and 'other grants'.

The 'research-oriented grants' comprise the block research grant plus other grants which are deemed to be used for research. The 'teaching-oriented grants' are those considered to be related to teaching-only activities and contribute nothing to the research expenditure estimate. The 'other grants' category are those grants which are not allocated specifically for research or teaching but which may contain elements of both to varying degrees.

In the case of the post-graduate research (PGR) element of the teaching grant, it has been agreed by the Funding Councils, CSO and OST that one-third of PGR will be included in the overall estimate of research expenditure.

It is not possible to rework figures for R&D expenditure in the HE sector before 1993-94. However the results of the two methods can be compared for 1993-94 and give broadly the same level.

18. Ministry of Defence figures for 1993-94 have been revised to reflect more accurate information on Research & Development expenditure now available.

Rounding of figures

19. There may be discrepancies between totals and the sum of their independently rounded components.

Important Notice

20. From April 1996, the CSO and the Office of Population Censuses and Surveys (OPCS) will be merging to form a new agency, the Office for National Statistics (ONS).

References

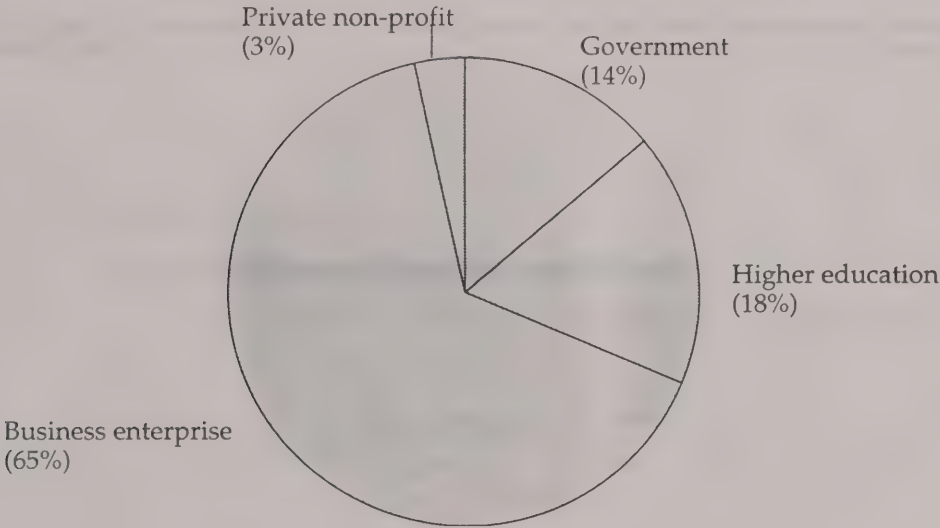
1. *Proposed Standard Practice for Surveys of Research and Experimental Development*, "Frascati Manual", OECD, Paris.
 2. 1993-94 outturn government R&D expenditure figures were in OST's *Forward Look of Government Funded Science, Engineering and Technology 1995*, HMSO, London; 1994-95 figures will be published in 1995 *Forward Look* available in May 1996.
 3. 1993 UK R&D figures were in *Economic Trends*, August 1995. 1994 figures will be published in *Economic Trends*, later in 1996.
 4. *Main Science and Technology Indicators 1994*. 1994 edition is due to be published in June 1996.
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R&D PERFORMED IN THE UK IN EACH SECTOR ACCORDING TO SOURCE OF FINANCE, 1994

	Sector carrying out the work					£million	
	Government	Higher education	Business enterprise	Private non-profit	Total	Abroad	
Sector providing the funds							
Government	1 712	1 740	1 130	136	4 718	304	
Higher education	2	109	—	—	110	..	
Business enterprise	197	157	6 841	213	7 407	..	
Private non-profit	47	354	—	120	521	..	
Abroad	64	199	1 559	34	1 857	..	
TOTAL	2 021	2 559	9 529	504	14 613	..	
of which:							
Civil	1 374	2 509	8 012	495	12 389	..	
Defence	648	50	1 517	9	2 224	..	

Source: Central Statistical Office

FIGURE 1
Sectors carrying out the work 1994



2 EXPENDITURE ON RESEARCH AND DEVELOPMENT IN THE UK BY SECTOR OF PERFORMANCE: 1983 TO 1994¹

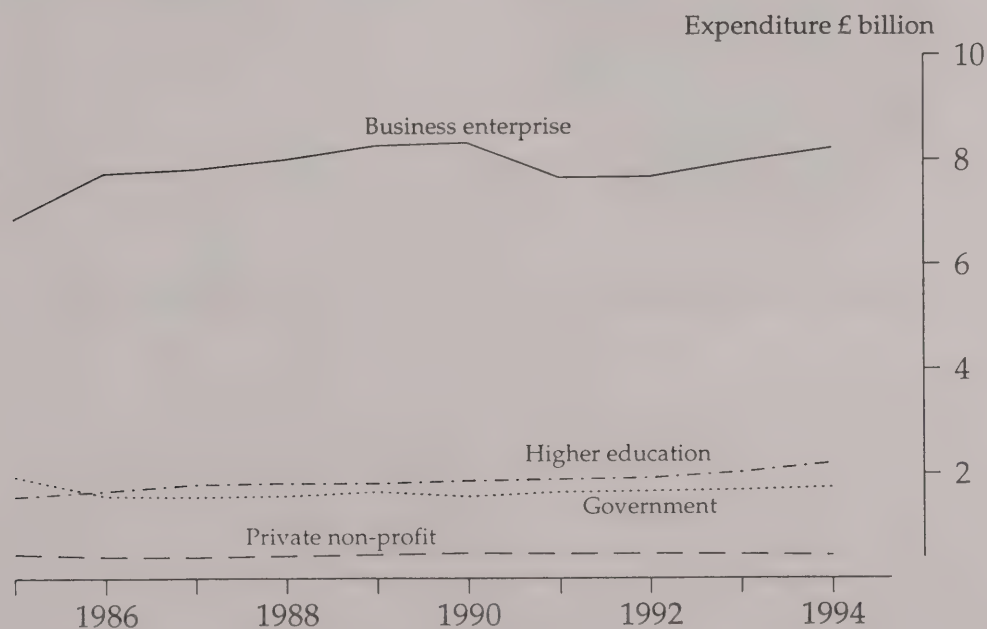
£million

		1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Sector carrying out the work													
In cash terms													
TOTAL	GLBA	6 664	–	8 093	8 768	9 383	10 227	11 288	12 238	12 406	12 981	13 829	14 613
Government	GLBK	1 357	–	1 457	1 212	1 264	1 360	1 534	1 566	1 757	1 846	1 928	2 021
Business enterprise	GLBL	4 163	–	5 122	5 951	6 335	6 922	7 650	8 318	8 135	8 489	9 069	9 529
Higher education	GLBM	950	–	1 170	1 288	1 460	1 575	1 689	1 873	2 020	2 129	2 312	2 559
Private non-profit	GLBN	194	–	344	317	324	370	415	480	494	516	520	504
As % of GDP	GLBH	2.20	–	2.27	2.29	2.22	2.18	2.20	2.23	2.16	2.18	2.20	2.19
Sector carrying out the work													
In real terms(1990 prices)													
TOTAL	GLBD	9 876	–	10 826	11 386	11 569	11 818	12 193	12 238	11 677	11 740	12 153	12 605
Government	GLBW	2 011	–	1 949	1 574	1 558	1 572	1 657	1 566	1 654	1 670	1 694	1 743
Business Enterprise	GLBX	6 170	–	6 852	7 728	7 811	7 999	8 263	8 318	7 657	7 678	7 970	8 220
Higher Education	GLBY	1 408	–	1 565	1 673	1 800	1 820	1 824	1 873	1 901	1 926	2 032	2 207
Private non-profit	GLBZ	288	–	460	412	399	428	448	480	465	467	457	435

1 Estimates are not available for 1984.

Source: Central Statistical Office

FIGURE 2
Sectors carrying out the work (in real terms)



3 EXPENDITURE ON CIVIL AND DEFENCE R&D PERFORMED IN THE UK BY SECTOR OF PERFORMANCE: 1989 TO 1994

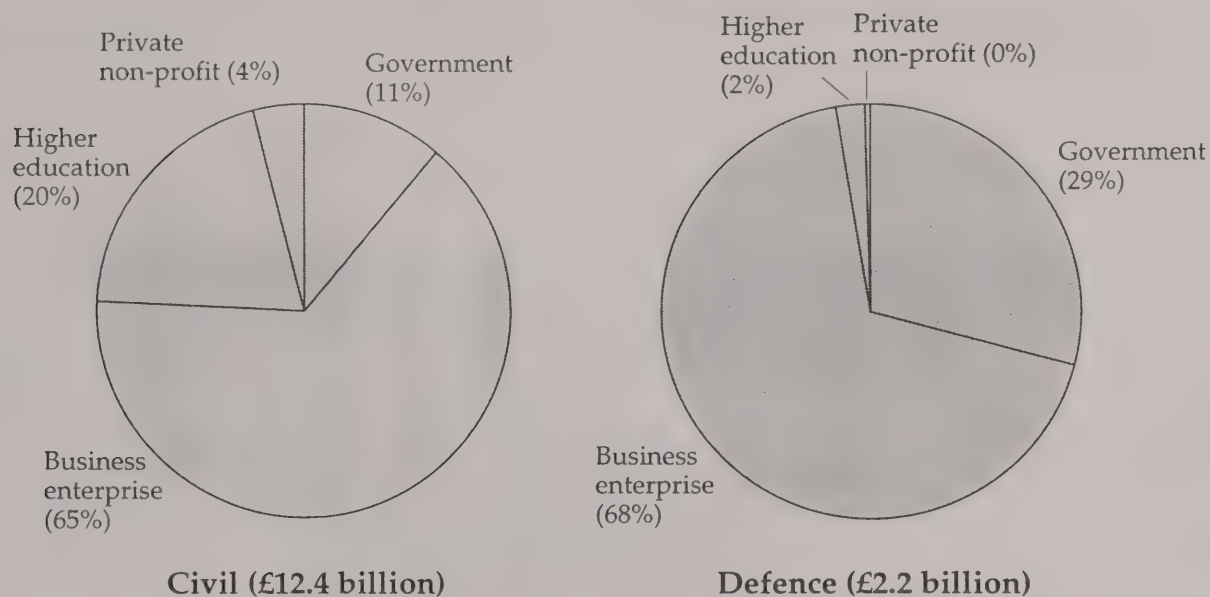
IN CASH TERMS

£million

		Civil						Defence						
		1989	1990	1991	1992	1993	1994		1989	1990	1991	1992	1993	1994
Sector carrying out the work														
TOTAL	GLBB	8 740	9 667	10 226	10 898	11 730	12 389	GLBC	2 548	2 571	2 180	2 083	2 099	2 224
Government	GLBO	743	808	1 087	1 214	1 251	1 374	GLBS	791	759	670	632	677	648
Business enterprise	GLBP	5 923	6 557	6 669	7 092	7 710	8 012	GLBT	1 727	1 761	1 466	1 397	1 359	1 517
Higher education	GLBQ	1 664	1 833	1 983	2 084	2 259	2 509	GLBU	25	40	37	45	53	50
Private non-profit	GLBR	410	469	487	508	509	495	GLBV	5	11	8	8	11	9
As % of GDP	GLBI	1.70	1.76	1.78	1.83	1.87	1.86	GLBJ	0.50	0.47	0.38	0.35	0.33	0.33

Source: Central Statistical Office

FIGURE 3
Sector carrying out the work 1994



4 EXPENDITURE ON RESEARCH AND DEVELOPMENT IN THE UK BY SECTOR OF FUNDING: 1983 TO 1994¹

£million

		1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Sector funding R&D in the UK													
In cash terms													
TOTAL	GLBA	6 664	—	8 093	8 768	9 383	10 227	11 288	12 238	12 406	12 981	13 829	14 613
Government	GLCA	3 299	—	3 462	3 541	3 640	3 665	4 031	4 262	4 248	4 355	4 522	4 718
Business enterprise	GLCB	2 766	—	3 772	4 199	4 643	5 331	5 788	6 156	6 248	6 666	7 172	7 407
Higher education	GLCC	33	—	49	54	65	77	81	84	90	98	101	110
Abroad	GLCE	458	—	640	800	840	937	1 134	1 428	1 457	1 458	1 617	1 857
Private non-profit	GLCD	109	—	170	174	195	217	253	309	362	404	418	521

Sector funding R&D in the UK

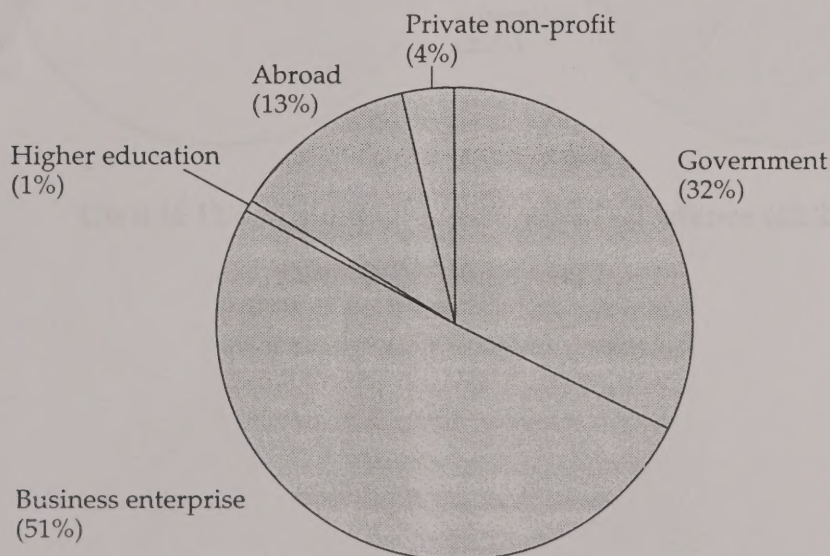
In real terms(1990 prices)

		1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TOTAL	GLBD	9 876	—	10 826	11 386	11 569	11 818	12 193	12 238	11 677	11 740	12 153	12 605
Government	GLCP	4 889	—	4 631	4 598	4 488	4 235	4 354	4 262	3 998	3 939	3 974	4 070
Business enterprise	GLCQ	4 099	—	5 046	5 453	5 724	6 161	6 252	6 156	5 881	6 029	6 303	6 389
Higher education	GLCR	49	—	66	70	80	89	87	84	85	89	89	95
Abroad	GLCT	678	—	857	1 038	1 036	1 083	1 225	1 428	1 371	1 319	1 421	1 602
Private non-profit	GLCS	162	—	228	226	241	251	273	309	341	365	367	449

¹ Estimates are not available for 1984.

Source: Central Statistical Office

FIGURE 4
Sector providing the funds 1994



5 EXPENDITURE ON CIVIL AND DEFENCE R&D PERFORMED IN THE UK BY SECTOR OF FUNDING: 1989 to 1994

IN CASH TERMS

£million

		Civil						Defence							
		1989	1990	1991	1992	1993	1994			1989	1990	1991	1992	1993	1994
Sector funding R&D in the UK															
TOTAL	GLBB	8 740	9 667	10 226	10 898	11 730	12 389	GLBC	2 548	2 571	2 180	2 083	2 099	2 224	
Government	GLCF	2 324	2 605	2 952	3 096	3 167	3 376	GLCK	1 708	1 656	1 296	1 260	1 354	1 342	
Business enterprise	GLCG	5 272	5 669	5 755	6 165	6 747	6 918	GLCL	517	487	493	502	425	489	
Higher education	GLCH	81	84	90	98	101	110	GLCM	—	—	—	—	—	—	
Abroad	GLCJ	839	1 030	1 094	1 156	1 303	1 466	GLCO	295	398	363	303	314	391	
Private non-profit	GLCI	225	281	335	385	412	519	GLCN	28	28	28	19	6	2	

Source: Central Statistical Office

FIGURE 5
Sector funding R&D in the UK 1994

